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GENERAL INFORMATION

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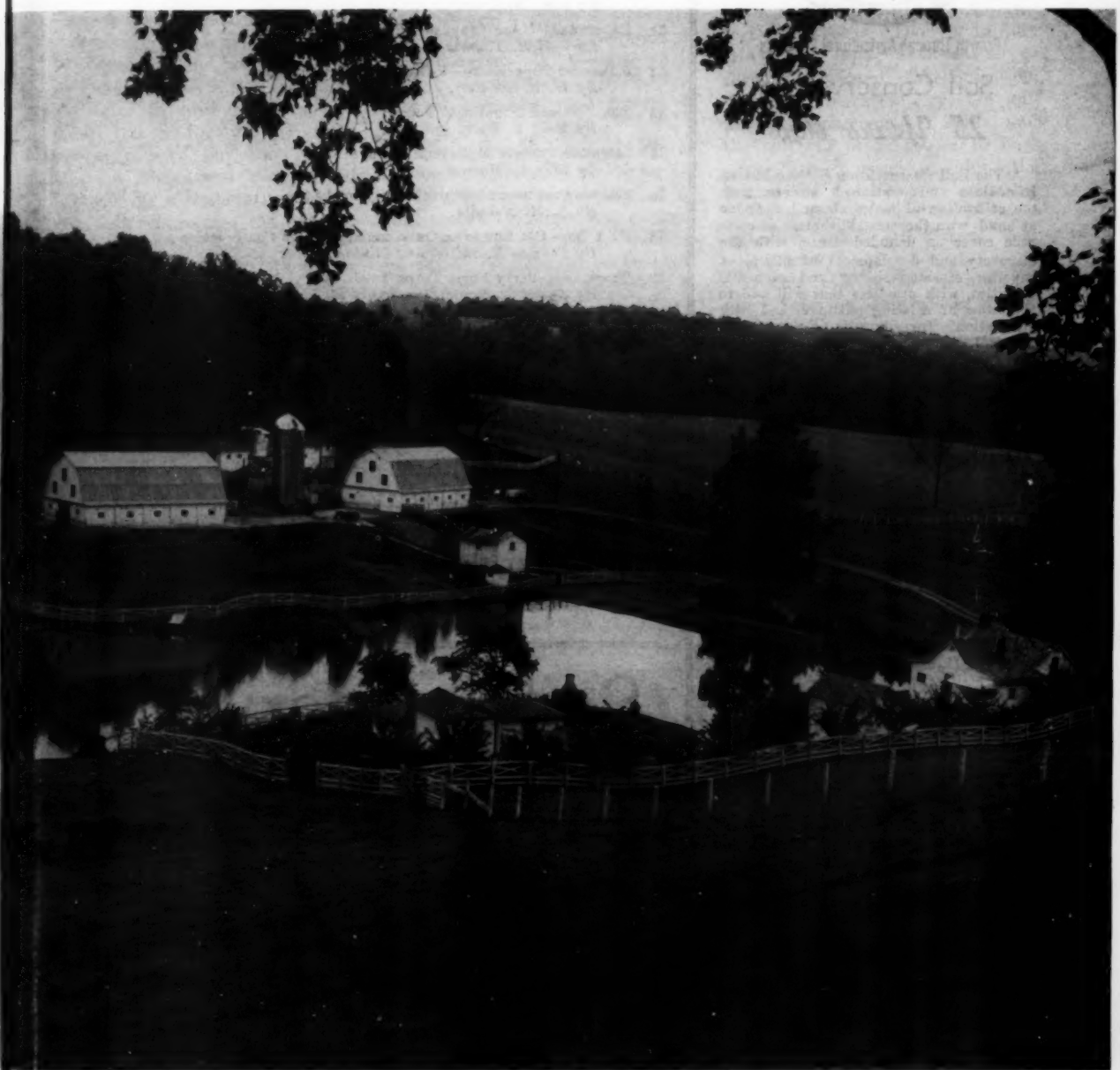
Soil Conservation



SOIL CONSERVATION SERVICE • U. S. DEPARTMENT OF AGRICULTURE

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Growth Through Agricultural Progress

Soil Conservation
25 Years Ago

"The Soil Conservation Service has an immediate and continued concern with the utilization of materials and weapons at hand, with the reestablishment of suitable cover on denuded areas, with the discovery and development of plants of superior erosion-resisting and economic qualities, with practices that will add to the value of existing pastures, and with cultivation for profits rather than losses."

• •

"The Service has helped owners to plan over 50,000 farms. The primary objectives are the control of soil erosion by wind and water, and moisture conservation. In planning a complete reorganization of the farm for soil and moisture conservation, the economics of a well-balanced farm program must have consideration at all times . . .

"The success of the plan in operation rests on the practicability and crop balance in the agronomic program, the efficient use and management of forest land, and the economy of the farm reorganization."

COVER PICTURE—This picture of prosperity on a Tygart Valley SCD beef cattle farm in Taylor County, W. Va., shows the results of using the land for its best purposes—pastures and hay, woodlands, and ample water.—Photo by Everett P. Leadbetter.

Soil Conservation

ORVILLE L. FREEMAN
Secretary of Agriculture

DONALD A. WILLIAMS
Administrator, Soil Conservation Service

SOIL CONSERVATION is the official organ of the Soil Conservation Service, published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget, June 26, 1958.

FRANK B. HARPER, Editor

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The Broadening Challenge Of Soil and Water Conservation

By Donald A. Williams

SOIL and water conservation as we know and practice it today is an across-the-board operation resourcewise. Federal, State, and local agencies and private interests have recognized this fact more and more in authorizations and actions taken for dealing more effectively with our soil, water, plant, wildlife, and recreational problems on a cooperative basis.

We can appreciate the breadth and depth of the Nation's conservation efforts when we consider the major undertakings established in this field: Soil conservation district programs; small-watershed protection and flood prevention projects; the Great Plains Conservation Program; the Agricultural Conservation Program; Rural Areas Development programs; farm recreational and other undertakings on non-Federal lands.

Soil and water conservation long since has outgrown the "gully plugging" stage. Today, it embraces every element of private land use and water management, from the most remote western livestock ranch to the easternmost rurban "strip" extending down the Atlantic seaboard.

Whether we are dealing with land for farms, forests, wildlife or recreational areas, suburban or other developments, it behooves us to use every parcel of land we possibly can for the purpose to which it is best suited. We have been blessed in this country with abundant land resources. We have used a good deal of our land badly in the past; but we are making gratifying progress as a nation in wiser use of our land and water resources.

It has been amply demonstrated, through soil and water conservation planning and treatment, that there are alternative uses of our land which the people who occupy and control that land must decide for themselves. We must think in terms of multiple, harmonious uses of our land and water resources.

This approach to one of the Nation's most basic problems involves decisions, and planning, by land users themselves—on individual farms and ranches, in soil conservation districts, in watersheds, in rurban areas, and wherever. It involves planning bolstered by technically sound facts developed during more than a quarter of a century of soil and water conservation research and on-the-land application of modern conservation technology.

Agriculture—including, importantly, the management of land and water—depends as never before upon sound scientific approaches to its problems in this space age of the 1960's. We no longer can afford to let Nature take its course, to rely upon rule of thumb methods of managing these resources, or to keep our eyes closed to mounting problems of land use and water management. A premium has been placed upon the most productive and efficient use of these resources.

Beginning in November 1960, SOIL CONSERVATION has devoted its monthly issues to specific technical and related components of the broad soil and water conservation program the Soil Conservation Service is charged with helping to carry out, as the agency of the Department of Agriculture responsible for technical and related services in this field. These issues of the magazine have now covered virtually every phase of the Service's activities.

In opening the special-issue series, I wrote: "Today's rapidly changing agriculture—larger farms, increased mechanization, vertical integration, greater emphasis on management skills, and the shifting of farmland to nonagricultural uses—provides the setting in which we must carry forward the soil and water conservation job." How true that still is today!

During this period of about 2 years, we have examined in successive months these topics of interest to all who are concerned with soil and water conservation, including a number of which are reflected in articles in this issue. New mehods for new problems—soil surveys—conservation range management—farm and ranch conservation planning—wildlife conservation—watershed planning and treatment—grassland farming—conservation on farm woodlands—conservation engineering measures—water conservation—cropland conservation—technology and machines in speeding conservation—the Great Plains Conservation Program—soil conservation districts—rural areas development—rurbanization—recreation and wildlife in outdoor preservation—plant materials—conservation needs—U. S. D. A.'s centennial from the conservation standpoint—conservation education—and conservation around the world.

Together they reflect today's multiple use of our land and water resources and the basic role that soil and water conservation has in insuring the ability of those resources to meet the Nation's needs in the future.

"Twice As Many Cows Twice As Easy"

By Clarence Kelley

RANCHER Ray Smith has a lot going for him today after a dozen years of good land use in Washington's breaks of the Snake River near Hay.

Since 1949 he has: Stepped up his cow herd from 120 to 230 head. Cut his acreage of poor condition range sites in half. Increased the number of top producing range sites more than 12 times. Established 145 acres of permanent summer irrigated pasture on a once barren, sandy river bar.

Smith laid the ground work for these and other gains soon after a Soil Conservation Service technician surveyed his land in the Whitman County Soil Conservation District.

The survey, which included reference to a soil survey map and an aerial photograph of the ranch, showed that only 2 percent of the grassland produced at peak capacity and provided maximum soil protection, 33 percent was in good condition, 53 percent was in fair condition, and 12 percent produced poorly. Figuring the feed potential of such key forage grasses as Bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass, poor range was turning out less than a fourth of what it should. Also, there was no good summer range; stock water was short, and the large size of some of the pastures made it impossible to defer and rotate grazing.

The soils map showed a 145-acre piece of low-lying benchland that might be adapted to irrigated pasture. Smith's first step was to drill a 320-foot well, with a capacity of 1,200 gallons a minute. More than a mile of 6- and 8-inch permanent irrigation main lines were buried, and 5,000 feet of 3-inch aluminum laterals were installed. Sprinkler heads supplying 6.2 gallons a minute were placed at 40- by 60-foot spacings. The entire system required a 950-gallon-a-minute turbine pump, operated by a 75-horsepower electric motor.

Today that formerly barren, low-lying bench is high-producing irrigated summer pasture, divided

Low-lying, barren and sandy bench before development.

Some of Smith's new summer irrigated pasture on the same land.

Note:—The author is work unit conservationist, Soil Conservation Service, Lacrosse, Wash.

into four main units seeded to a mixture of smooth bromegrass, alta fescue, orchardgrass, white Dutch clover, and birdsfoot trefoil. Each main pasture is subdivided into four lots, each of which is grazed for 6 days and given a recovery period of 18 days. With this rotation system, the grass is never harmed by overgrazing. At an annual operating cost of $10 an acre, the irrigated pasture solved the summer feed problem; but to provide hay, another plot of land also was irrigated, and seeded to Ladak alfalfa. It is never pastured.

Eight miles of additional fencing was needed for the new system of management. In order to have water in each of the dryland range units, Smith developed three springs and installed watering troughs. As a result of his conservation development, Smith now has five units managed under a rotation deferred system where 12 years ago there were only three dryland range units.

He normally begins using his irrigated pasture by May 1, so that most of his range is deferred and allowed to produce viable seed.

Smith (right) and Jim Hopkins check range after summer's rest from grazing.

His cows are turned from the irrigated pasture back to dry range in October. Each time a different range is used. Many of the low-producing range areas were plowed and seeded to intermediate wheatgrass, and are producing four times the feed they yielded before. In contrast to its 1949 production, 25 percent of Smith's rangeland now is rated as excellent, 38 percent as good, 27 percent as fair, and only 6 percent as producing poorly, with 4 percent reseeded.

The payoff on his pasture development and range improvement and management system is a gain over 1949 of 67,000 pounds of extra beef annually, plus an additional 100 head of cows he now can run on the same acreage.

"It wasn't easy," Smith said. "Our conservation plan helped us a lot when we had our goals set. I can remember times when I thought we would never make it. One year we seeded that barren sandy soil three times, and each time the wind blew the seed away. But the fourth time she stayed. Today we have one of the finest pasture stands you could ever hope for. You know it really seems odd, but now I can run twice as many cows twice as easy as I could a dozen years ago."

TERRACING

Old Practice Goes Modern

By Ivan McKeever

MODERN terraces etching the cultivated countryside from coast to coast are an outgrowth of the ditch-like terraces first used in this country in the late Colonial period.

Terracing, one of the first measures to be used in soil and water conservation land treatment in the 1930's, is recorded as having been practiced for the first time in Pennsylvania by John Lorain, ardent conservationist, who began farming near Philipsburg in 1812.

Note:—The author is State conservationist, Soil Conservation Service, Harrisburg, Pa.

He described the practice in his writings by pointing out that there were systems of water diversions constructed on his farm after careful survey, according to the lay of the ground. He believed they should be laid out properly, even though sometimes it was necessary to run them in "serpentine" courses.

The ditch method of diversion terraces was improved upon in the early work of the Soil Conservation Service. However, many of these early terraces were narrow and deep, making it impossible to cross them with farm machinery.

A typical modern broad base diversion terrace easy to work over with farm equipment.

Constant effort has been made by Service conservationists in Pennsylvania to improve the design of diversion terraces to make them more applicable to modern machinery-farming. The steep and

Then.—Diversion terraces being built by hand on Lancaster County, Pa., farm in early demonstration project days.

Now.—Large machines are used today to build broad base diversion terraces like this one in Perry County.

hard-to-manage diversion terrace of the early days has been modified so that today's farm equipment can operate over properly built broad-base stuetures, now to be found on hundreds of farms in the State.

Farmers' liking for diversion terraces in Pennsylvania has been closely associated with the change in their design. In 1946, 93 miles had been built to handle water runoff, while at the same time enabling farmers to continue harvesting their crops with such modern farm machinery as side delivery rakes and hay balers. More than 3,000 miles of these diversion terraces now have been built in Pennsylvania. Because many more miles are needed, the rate of building them undoubtedly will continue to be speeded up.

To facilitate the layout and construction of these broad-base diversion terraces, a construction guide was developed that calls for cross sections large enough to carry runoff water, and broad enough to enable farmers to perform their necessary management and tillage operations without impediment.

"You don't have to worry about losing land through the use of diversion terraces," says Royal Champluvier of Bradford County. "In 1960, for example, one of my 800-foot-long diversions yielded 250 bales of trefoil hay. This yield was equal to the yields I normally get from all the rest of the fields."

So it is that the diversion terrace has proved to be a key practice in the development of a well-balanced soil and water conservation program in the Keystone State. Diversion terraces not only control erosion, but they also are effective in improving drainage on many soils. Properly spaced diversions have improved drainage remarkably in most instances.

Typical of comments by Pennsylvania farmers who have built these terraces is that by Emmons Harvey of Wyoming County, who has put in 10,000 feet of diversions on his 200-acre dairy farm: "Through the use of these diversions, I have been able to get on my fields at least 2 weeks earlier in the spring, and they are some of the most productive areas on my farm."

"These terraces," says Orton Mattocks of Bradford County, "have also helped reduce erosion considerably."

Diversion terraces also are popular with Pennsylvania farmers on better drained soils. More and more of them realize that these structures dividing the fields into smaller watersheds will greatly reduce damage by surface runoff. Oliver Grove in Huntington County, for example, has built more than 5,000 feet of diversion terraces on his farm.

"The purpose of the terraces," he said, "is to protect the land from heavy storms, which have caused considerable soil washing in the past. The diversion terraces now control this excess runoff."

◆

About 2 million of the 4.6 million farms in the U. S. produce 90 percent of our agricultural products; the remaining 2.6 million farms produce only 10 percent.

"Crawdads" Are Crayfish —and Vice Versa

By Carl H. Thomas

THE lowly "crawdad" that served as bent-hook fishing bait for a retiring generation is coming increasingly into its own on epicurean menus as "crayfish" produced as a bona fide conservation farming crop.

A rotation of rice, crawfish, as the fresh water crustacean is commonly known, and pasture is producing as much as 700 pounds of edible crawfish an acre on lands in southwest Louisiana. Until recently, natural swamps, floodways, and bayous have been the source of this seasonal delicacy. Now, it is being grown in fields managed specifically for its production in rotation with rice and grass.

Soil Conservation Service conservationists are helping farmers develop plans for working crawfish into their rice rotations. Such planning and land use is a farmer decision based on a consideration of the capability of each acre of his land. Rotations like this, and other land-use and conservation practices needed, are part of basic conservation plans for entire farms.

A typical "crawfish field" starts out as native pasture. The pasture is plowed and planted to rice in the spring. When the young rice is 4 to 8 inches high, the field is flooded with from 6 to 18 inches of water. It remains flooded until late August or early September, when it is drained and the rice is harvested.

Immediately after harvest, the stubble and straw is flooded with from 12 to 30 inches of water pumped from deep wells, canals, and bayous, and the water is maintained at this level. The rice stubble provides food for the crawfish, both directly as it decomposes and indirectly by increasing the growth of aquatic plant and animal life. The crawfish grow rapidly when the water begins to warm up in early spring, and have been known to grow as much as 3 inches in a month. They usually are big enough for the crayfish market by February or March; and at the end of the crawfish season in June, the field goes into pasture until rice is planted again.

People of all ages walk the rice levees "crawfishing" with traps, small nets, poles, and buckets. For commercial fishermen, it is a profession. They use 4 to 6 cylinder-type traps to the acre, baited with fish, beef melt, or other bait. The traps are placed at random in the field and are checked once or twice daily. They usually yield from 1 to 5 pounds of "crawdads" each time they are lifted.

This kind of water management is giving rice farmers added income and land-use alternatives. The crawfish "cropping" also seems to reduce weeds and smooth the land. Beforehand planning and field selection are "musts" in producing crawfish in rotation with rice. A field should have a resident population of the red-swamp crawfish, or it may be stocked with egg-bearing adults while the field is flooded during May or June.

Fields on which the rice is harvested in August or early September appear to grow more and bigger crawfish, when the water level is maintained over the stubble during the winter at a depth of 12 to 30 inches—the deeper, the better. The fields selected normally have rather high outside levees.

Additional management techniques, such as fertilization of the water, water fluctuation, and stocking, are being tried by soil conservation district cooperators at the present time. These pioneers in crawfish farming are extremely interested in this added operation, because they believe it is one more wise soil and water use for their lands.

A 26-acre ricefield on Gilbert farm flooded for growing crawfish. Between 10,000 and 15,000 pounds of crawfish taken from this field sold for 15¢ a pound.

These 250 pounds of crawfish represent a half-day's catch from a 38-acre ricefield flooded after rice harvest. (Owner Bert Gilbert, right.)

Note:—The author is biologist, Soil Conservation Service, Crowley, La.

Top l.—Buchanan on rootplowed and seeded land at end of first season.

Top c.—Cox on rangeland heavily infested with mesquite.

Top r.—Houston (and son Kenneth) checking grain sorghum residue.

Lower l—Crawford in small grain grown for cover and soil improvement.

Lower r.—Shaw examining residue from harvested sorghums.

5 District Supervisors—
5 GREAT PLAINS CONTRACTS

By W. S. Goodlett, Jr.

MEMBERS of the board of supervisors of the Martin-Howard Soil Conservation District in Texas practice what they preach. Every one of them has a Great Plains Conservation Program contract to help him carry out a complete conservation program on his land.

Another 131 district cooperators had cost-sharing Great Plains Conservation Program contracts as of July 1 this year.

Note:—The author is area conservationist, Soil Conservation Service, Big Spring, Tex.

Each of the Great Plains Conservation Program contracts provides for the establishment of a complete conservation program, developed with technical help of the Soil Conservation Service. Cost-shares are allowed for permanent-type practices such as cross fences, livestock water wells and storage facilities, brush control, underground irrigation pipelines, seeding of grass, and terracing.

Chairman Jack Buchanan of Big Spring has a contract on his stock farm, which includes 348 acres of grassland and 594 acres of cropland. He uses a conservation cropping system for his cotton, grain sorghum, small grain, and sorghum alum; practices crop residue management; and has built terraces and practices contour farming for water conservation and erosion control.

Twenty-three acres of the pastureland, on which he follows conservation use, were rootplowed to control the mesquite trees and seeded to a mixture of blue panicum and side-oats grama; and 145 acres will be pitted and seeded to side-oats grama and Caucasian bluestem grasses. To provide water for his registered Herefords, Buchanan drilled a well.

Vice-Chairman Bob Cox of

Tarzan has a contract on his stock farm, which has 400 acres of cropland, 300 acres of it irrigated, and 943 acres of rangeland. He also uses crop rotation and residue management, and planned to terrace the dry cropland. His plan also includes reorganizing his irrigation system to cut water loss, including installation of a high-pressure underground main line for the sprinkler system. He grows cotton, grain sorghum, forage sorghums, and small grain. Cox plans to control mesquite trees with aerial spray of 2,4,5-T so he can improve his grassland through deferred grazing and proper grass use.

Secretary of the Board Bernard Houston of Stanton has a contract on his combination farm and ranch including 3,619 acres of rangeland and 536 acres of irrigated cropland. Mesquite control has included 1,305 acres of rangeland rootplowing and seeding, and 1,353 acres of treatment with 2,4,5-T. His other grassland improvements include building cross fences, drilling wells, with storage tanks, and practicing deferred grazing and proper use.

His crops are cotton, alfalfa, and sorghums, grown in rotation. His sprinkler irrigation systems likewise are being converted to underground lines.

The contract of Board Member J. D. Crawford of Midland is on his farm of 160 acres of irrigated cropland and 149 acres of cropland that is dryland farmed. Twenty-four acres of the irrigated cropland will be converted to a bermudagrass pasture for livestock. Crops grown on the cultivated land are cotton, grain sorghum, and small grain; and he also uses crop residue management. His reorganized sprinkler irrigation system likewise will have an underground main line.

Larry Shaw of Knott, the other member of the soil conservation district board, has a 480-acre dryland farm that is all in cropland. With help of his Great Plains Conservation Program contract, 135 acres will be planted to a mixture of blue panicum, plains bristlegrass, and green sprangletop to provide for grazing of livestock; and part of the cropland will be used to grow forage sorghums for silage.

Shaw's other conservation measures include crop residue management, cotton stripcropped with sorghums to furnish additional protection against wind erosion, and a well drilled for livestock water.

The "Second Frontier" Today

By Emil E. Ebert

IT was a decade and a half ago that the conservation face lifting of two rundown farms in Licking County in Ohio was billed as the "Second Frontier."

The event attracted people from all over Ohio and neighboring States. The late Hugh Bennett, father of the modern soil and water conservation movement and first chief of the Soil Conservation Service, was the featured speaker; and a monument was erected in honor of this pioneer conservationist.

Now that conservation farming has spread across the Nation, and a lot of water has gone through the spillways of thousands of conservation dams, many are wondering what is left of all the commotion of the "Second Frontier." The two farmers on whose land the event was held recall the story of the event that took place at the highest elevation in Ohio, along the nearly 50-mile long Old National Trail, now U.S. Route 40. They recall, for instance, that it was a bright day in October, with bands playing the National Anthem, and thousands of people standing at attention during the raising of the flag as the historical conservation event began.

Here, in one day, hundreds of local farmers and townspeople accomplished what it would take the average farmer years to get done. Diversions, ponds, and waterways were built. Fences on the farms were removed and replaced to fit the contour strips that had been laid out. One unusual event was re-locating a property line fence to follow the contour of the land. It required a change in the deeds of two farms!

John Rodman still is owner of the farm divided by the Old National Trail.

"Contour farming really pays off in the hilly farm sections," is the way he describes the results. "It's much easier to farm with the contour of the land than to fight soil erosion.

Conservation VIP's at "Second Frontier": Late author Louis Bromfield, general chairman of event and former Friends of the Land president, flanked by former SCS Ohio State Conservationist Tom Kennard (left) and late SCS Chief Hugh H. Bennett.

Note:—The author is soil conservation aid, Soil Conservation Service, Newark, Ohio.

Before.—Almost useless swampy area on Rodman farm at time of "Second Frontier."

After.—The area today with farm pond and pine trees and multiflora rose wildlife planting.

"In 1946, our corn yield was 50 to 60 bushels an acre, and our wheat yield was 15 to 20 bushels an acre. Now, after the 'Second Frontier,' our corn yield has increased to 80 to 100 bushels an acre—even better some years. The wheat yield has jumped to 25 to 30 bushels to the acre. Our grass and legume yields have been much better than ever before. The water from our springs has increased. These springs alone are worth their weight in gold."

Hundreds of people have visited the Rodman farm since the "Second Frontier," and many farmers since have changed their methods of farming.

Bob Latham, son of the owner of the other farm at the time of the "Second Frontier," now is its owner and operator. It was on this farm that the most severe erosion had taken place.

"The gullies on parts of our farm were so deep we could hardly get farm machinery around," he recalls. "Now these areas are level, and the raw areas are covered with heavy grass sod or planted to trees. The contour farming and diversions have helped us keep the soil in place on the cropland fields. Our soil fertility has increased to where we can get a good return from the farm. We have had many people visit our farm from Ohio and surrounding States, and many from much greater distances. Included are classes of high school and university students."

Photographs of the land as it was in 1947 tell the story of the change from the past to today. Where there once was a swampy area of no value, for example, there now is a conservation farm pond surrounded by about an acre of pine trees and multiflora rose. This planting has increased the wildlife population on these farms and the surrounding areas. Many people come to the Rodman and Latham ponds each year to fish. Mrs. Rodman told of seeing five deer on their lawn early one morning.

On the Latham farm, where there used to be gullies 4 feet deep, the land now is covered with pine trees. Their survival has been good, and are serving their primary purpose well in stabilizing the soil on this gullied hillside, in addition to growing into merchantable timber.

Multiflora rose fences, meanwhile, are growing vigorously on both farms. Latham remarked that these living fences have a two-fold purpose: They provide an economical fence; and they make a home and provide food for such wildlife as rabbits, quail, and songbirds.

Thus the effects of the "Second Frontier" have spread throughout Ohio's Licking County, and those who started this action have remained true to their pledge to use wisely and well the land that their forefathers brought under the plow a century and a half ago.

Intensive Pasture Management Pay$

By Glen E. Murray

MURRAY Webb, a cooperator with the Dixie Soil Conservation District at St. George, Utah, sets a pattern in pasture operations for many dairy farmers of his area.

Murray planted his first pasture in 1951, and, to put it in his words, "The mixture was a poor one containing about everything in the book." The composition of this pasture has changed over the past 10 years, because of different types of grazing operations; but a good balance of grasses and legumes is now being maintained, and "it gets better each year." The principal species are Ranger alfalfa, ladino clover, Lincoln bromegrass, and orchardgrass.

Mr. Webb divided his 8-acre pasture into four 2-acre plots for grazing management purposes. The plots are grazed by the "strip" method. This is accomplished by moving an electrically charged wire "up" the 2-acre strip about 5 rods each morning and evening. This method has proved to be the best so far used by Webb, who is always looking for a better way to do things. He planted two of the strips to Latar orchardgrass, Liso bromegrass, and Ranger alfalfa for grazing the first time this year, and likes the new mixture better than that on the other two strips.

Webb's 27 milk cows graze the 8 acres for at least 7 months each year. They are not just average cows; during 1961 they produced 570 pounds of butterfat per cow (15,034 lbs. of milk) on DHIA test. In addition, the cows are followed on each pasture plot by a dozen bred heifers for 2 days before the pastures are clipped and irrigated.

Webb gears application of fertilizers strictly to the needs of the pasture plants for maximum production of high-quality forage. He applies approximately 20 tons of barnyard manure to the acre annually, and this is often supplemented with commercial phosphate or nitrogen when it is needed to maintain a balance of grasses and legumes.

Irrigation water is available "on call," and is applied by the border method, in accordance with the needs of the plants and the soil. The soils are uniform in their water-holding capacity. The principal variable, insofar as soil, water, and plant relations are concerned, is the variation in temperature during the growing season. Irrigation water is generally applied twice between grazings, and the pastures always are allowed to dry out a couple of days after irrigation before being grazed. This precaution prevents excessive compaction.

Note:—The author is agronomist, Soil Conservation Service, Salt Lake City, Utah.

Dairy cattle grazing one of Murray Webb's improved pastures.

Part of a freshly grazed pasture in the foreground with a pasture in the background awaiting grazing.

The Webb cows have free access to water and shade, and he keeps dry hay available to them at all times. He pridefully says:

"With 20 cows and 12 heifers grazing these pastures in 1960, I still had more surplus forage to cut and bale when clipping than I had when I was grazing 6 fewer animals. This amounts to about 200 bales a year. My improved pasture is the best money-making crop per acre that I have ever grown, and that includes sugarbeet seed, alfalfa hay, small grain, and silage."

The cost-return ratio, supports the soundness of Webb's management program. It also is apparent that all basic management items are being considered in his pasture program. When you get this kind of plant, grazing, irrigation-water, fertility, and livestock management, it pays off.

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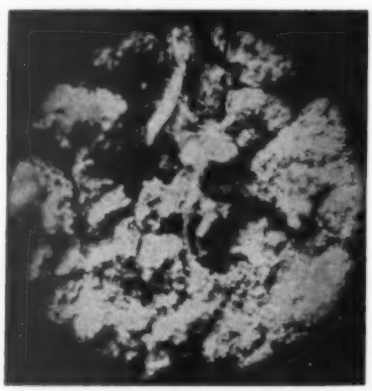
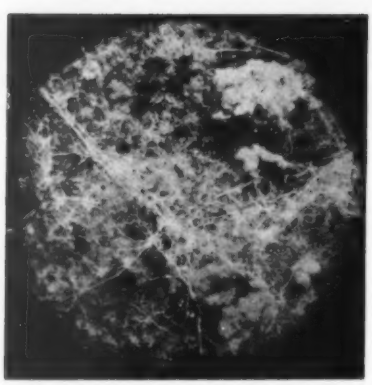
More than 54 million people live in rural areas in the U. S.

Microorganisms and T

By T. McC

Structure of surface and subsurface soil (magnified 12 times). 1.— Peorian loess, showing lack of granulation; 2.—surface soil with good granulation.





Fungus mycelia growing in soil and binding it into stable aggregates (magnified 12 times).

EACH spoonful of a fertile soil contains more living microscopic organisms than there are people on the earth—some 3 billion. These microorganisms include microscopic plants, such as bacteria, actinomycetes, and fungi; microscopic animal life, such as protozoa and nematodes; larger organisms such as earthworms and insects; and many other living things.

Microorganisms with their enzyme systems act as a digestive system and spread throughout the soil, having contact with every soil particle and plant root. Microbial activity is particularly intense around a plant root. Whenever plant or animal residues are returned to the soil, they are broken down by this teeming microscopic population, if soil conditions are favorable. The materials remaining after decomposition are carbon dioxide, water, nitrates, phosphates, sulfates, and salts of calcium, magnesium, potassium, and many trace elements. Many organic substances are produced during residue decomposition. Some influence plant growth.

Soil conditions affect the activity of microorganisms. For example, if the soil is frozen, little activity takes place. Optimum temperature for microbial growth is about 75-85° F. However, some microbial activity takes place at 40 to 60° F.

Oxygen is needed for the growth of beneficial microorganisms. Too little oxygen in the soil may encourage the growth of anaerobic microorganisms which reduce the iron, sulfates, and nitrates. The soil may become gray because of reduced iron; nitrates (through denitrification) may be lost, and the sulfates may be reduced to hydrogen sulfide, which is toxic to plants.

Microorganisms need inorganic nutrients such as nitrogen and phosphorus. They also need organic substances, such as plant residues, for energy. Given a suitable environment and food, they will grow and reproduce.

Growing microorganisms perform such beneficial functions as decomposing plant and animal residues, liberating nutrients for growing plants, and stabilizing soil structure, important in soil and water conservation. Some of the undesirable influences of microorganisms are in the "tie up" of nitrogen and phosphorus during decomposition of cereal crop residues, conversion of sulfates to hydrogen sulfide, or the loss of nitrogen from the soil by denitrification. They also may compete with crop plants for the available nutrient supply.

Microorganisms vary greatly in their ability to stabilize soil aggregates. Some, like *Stachybotrys atra*, are highly effective, but most of them have only a moderate effect. A method is needed to utilize these few organisms that are effective in decomposing crop residue.

Under laboratory conditions, some microorganisms produce organic compounds, such as antibiotics, which control the activities of other microorganisms. Also, some microorganisms produce organic chemicals which influence plant growth, such as gibberellic acid. Microorganisms grown on agar plates produced substances which caused the roots of germinating corn to grow upward. Many plant residues contain organic compounds which influence plant growth. Research is needed to learn whether these substances are produced by microorganisms in the

d Their Activity in the Soil

By T. McCalla

soil and in sufficient quantities to affect plant growth.

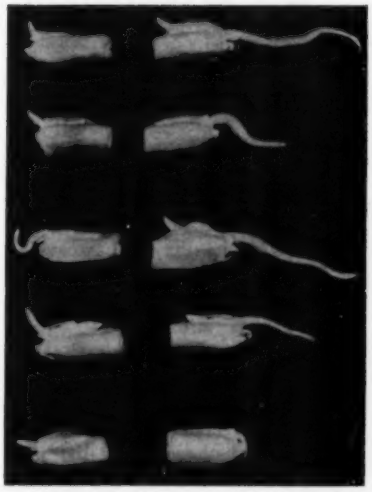
Microbial activity can be controlled to some extent by the placement of residues in and on the soil; by the kind and amount of residues added, moisture control by irrigation, and temperature manipulation by mulching; and by the addition of fertilizers. Eventually it may be possible to control microbial activity even more, in order to regulate nutrient supply and provide soil conditions for maximum effects on plant growth.

Today, several chemicals are widely used on the farm to control disease organisms and insects. Eventually it may be desirable and possible to go a step further and entirely eliminate the existing soil flora by sterilization; then superior microbes could be added to the soil, such as highly effective soil stabilizers, better nitrogen fixers, nitrifiers, and possibly microorganisms which produce plant growth regulators, or chemicals which might reduce plant disease.

Every management practice influences microbial activity; and, conversely, microbial activity determines how well a management practice works. An example of an effective soil and water conservation practice is stubble mulching. The crop residues are a food for microorganisms. As a result, the number of bacteria, fungi, antinomycetes, nematodes, denitrifiers, and earthworms are increased in the surface inch of soil, where the activity of the microorganisms increases stability of soil aggregates and the organic matter, total nitrogen, and acid-soluble phosphorus increase.

Nitrogen and other nutrients may be tied up and be unavailable to crop plants. Substances toxic to plants appear to be produced under stubble mulching conditions. In some cases the residues themselves contain substances which affect plant growth. As a result of microbial activity, crop yields on stubble mulching are often slightly less than those on plowing.

Thus, many of the cropping and tillage practices that a farmer uses in a conservation program are effective in crop productivity because of their influence on microbial activity. Legumes that are well nodulated are turned back into the soil to increase available nitrogen for the following crop. When the soil is tilled, aeration is improved and conditions made favorable for the growth of the nitrogen-, sulfur-, and iron-oxidizing organisms.



L.—Root sprouts of corn germinated on peptone plates in presence of microorganisms turn upward; r.—control seeds germinated on Crone's medium.

No. 68

This is the sixty-eighth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

Stubble-mulch residues stimulate growth of soil microorganisms and help control soil erosion.

Note:—The author is microbiologist, Agricultural Research Service, Lincoln, Nebr.

FFA BOYS GET LOWDOWN

On Woodland-Range Conservation

By Thomas N. Shiflet and Clinton L. Harris

TIMBER and grass are the two most important crops in Louisiana's Calcasieu Soil Conservation District around Leesville. That is why the district has carried on an educational program on soil, water, and plant conservation with youth groups since 1950.

"Well-trained youth is the key to our future agriculture," says Robert D. Schaefer, chairman of the district's board of supervisors.

The newest phase of the district's youth work has been on grazing management of pine woodland. The district is located in the heart of Louisiana's longleaf pine belt, where the natural vegetation consists of an open stand of pine trees and an abundant understory of grass. The area has been used for cattle grazing since it was settled by white men. There are approximately 1½ million acres in the district that will produce livestock and timber at the same time, and the area's economy is geared accordingly.

The woodland-range management program was started in 1960 with the seven FFA Chapters in Vernon Parish, with a September tour at the West Louisiana Forest Festival. Important native forage plants were identified and discussed as to their forage and erosion control values as indicators of range trend, and other values. At the end, a contest was held and identification of the plants discussed. The winner from each school was presented an award by the district.

In 1961, the program was continued with a summer tour and contest on the B. A. Graham ranch south of Leesville. Here, the boys and their teachers observed an actual conservation operation that included the management of timber and range forage in keeping with land capability. Many of the boys and teachers took time out from their summer vacation to participate. Two Leesville business firms awarded prizes to the contest winners.

The tour and contest at the Forest Festival was repeated in September 1961, with high interest and participation. The high-scoring boy from each school again received an award from the district.

The tours and contests both years were conducted by Soil Conservation Service technicians assisting the district. Teachers and boys alike are interested in the program. Grades on the contests have improved each time, indicating that steady progress is being made. Some of the teachers are incorporating this work into their regular class instruction.

The district plans to continue it's work with the FFA Chapters. The objective is to make soil and water conservation a tradition with today's youth who will be operating the land tomorrow.

Note:—The authors are respectively, range conservationist, Lake Charles, La., and work unit conservationist, Leesville, La., both of the Soil Conservation Service.

FFA boys, teachers, and others listen as SCS range conservationist discusses grass and timber conservation.

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H. H. Krusekopf, professor emeritus of soils, University of Missouri, reports too much wet weather has a harmful effect on cropland soils. Air is excluded and oxidation of the minerals is reduced, plant nutrients are not released and may be lost by leaching, soil aggregates are destroyed and soils become compact and crusty, and there is less response to fertilizer, although fertilization may be the most effective way to treat the land.

Truck Crop-Berry Farm Turns To Grass

By Austin B. Summers and Olin M. Thorud

Laying tile in lateral lines 40 feet apart.

M. D. McGregor has demonstrated on his 40-acre farm near Gresham, Oreg., what can be expected from good pastures on sloping lands that are subject to soil erosion when truck crops and berries are grown on them.

Twenty-one and a half acres of this farm, operated according to a conservation plan worked out through the Multnomah Soil Conservation District, furnished 11,340 cow-days of pasture in 7 months in 1961 for 50 head of polled Hereford cattle and 4 horses, plus 42 tons of grass-legume hay not needed for pasturing. These results are in contrast to the local average of 2 tons of hay an acre, or the pasturing of 1½ head of cattle to the acre.

This year, he is pasturing 55 cattle and 2 horses on 29 acres of New Zealand white clover and Akaroa orchardgrass seeded in alternate rows, including 6½ acres planted in 1961, and estimated a third more hay than last year.

Note:—The authors are, respectively, work unit conservationist, Boring, Oreg., and Soil conservation aid, Gresham, Oreg., both of the Soil Conservation Service.

The farm is rolling land with slopes varying from 4 to 29 percent, and with topsoil 20 to 36 inches deep.

When McGregor bought the place, it had been used principally as a truck crop and berry farm. His plan from the start was to use it for hay and pasture for a small herd of beef cattle. The real-estate man suggested that he contact the soil conservation district, and in the summer of 1958 Soil Conservation Service technicians from the district helped him develop his conservation farm plan. Ten acres of steeper land had been retired from truck crops in 1955 and were in grass, and another 2-acre field had been planted to clover in the fall of 1957.

Under the district plan, a conservation cropping system was worked out calling for one year in grain as a clean-up crop, to be followed by a winter cover crop for soil protection. The grain is plowed down for green manure the next April, preliminary to 1 year of new seeding and 5 years' use for hay and pasture. During the planning stage, McGregor and an SCS technician looked at different pasture mixtures in the district and chose a mixture of Akaroa orchardgrass and New Zealand white clover seen in trial plantings of alternate-row seedings.

Approximately 6,000 feet of tile was installed on two wet fields in April 1959. The tile was laid on the contour, 4 feet deep, with laterals spaced 40 feet apart. Tiling on the contour was needed to cut off seeps and lower the water table for optimum root growth, and to permit pasturing earlier in the spring.

In June, McGregor planted 3 fields to an alternate-row seeding of 3 pounds of New Zealand white clover and 8 pounds of Akaroa orchardgrass. An old grain drill was adapted for the alternate-row

McGregor's lateral 4-inch-tile lines set to grade 4 feet deep on the contour of 15-percent slope.

Year-old alternate-row seeding of Akaroa orchardgrass and New Zealand white clover on M. D. McGregor farm.

seeding, by putting plywood dividers in the box, with every other compartment marked for the legume seed. Enough inoculated clover seed for 3 acres was mixed at a time, or 9 pounds with 27 pounds of rice hulls as a dilutant, and 24 pounds of Akaroa orchardgrass in 21 pounds of rice hulls.

The drill was set for planting barley at the rate of 160 pounds per acre. This put approximately 55 orchardgrass seeds and 40 to 45 New Zealand white clover seeds per lineal foot, in alternate rows. The drill was set to plant as shallow as possible, or not more than ½ to ¾ inch deep. After planting, the fields were rolled again with a cultipacker.

During the summer of 1959, the fields were clipped to keep weed growth down, and pastured lightly in the fall. In August, 300 pounds of 20-percent superphosphate an acre was applied by spreader, and in March 1960, 200 pounds of ammonium phosphate (16-20-0) to the acre was applied to all pastures.

Another 9½-acre field was planted to the same grass-legume mixture in the spring of 1960.

Japanese Conservation Success Story

By Eldon Wrenn

HOW is it possible to build a farm out of salt-saturated land where the water table is so near the surface that horses mire down and die?

No one knows better than Kiyoshi and Roy Yamashita, who farm in the Moapa Valley in southern Nevada. Their proof is a vegetable farm on which about $30,000 worth of produce a year is being grown as compared to only $3,000 worth a few years ago. The Yamashita boys' grandfather on their Mother's side, first went to Brazil from Japan. He came to the United States in the early 1900's, traveling overland by burro and working en route. It took him 1½ years to make the trip from Brazil to California. About 1913, he sent for his son-in-law (Kiyoshi's and Roy's father) to come from Japan to help him farm in California.

Their father settled in the Moapa Valley in 1925 on what is now called "the Murphy place." Kiyoshi was the fourth child in a family of 12. Roy is next to the youngest.

With such a large family, the father had just managed to get started in farming when the 1929 depression hit with full force. The farm, which included about 35 acres of fairly good land, was lost.

"Had the financial and technical help available to farmers now been there for my dad's use, I think he could have saved the farm," Kiyoshi says.

The elder Yamashita than leased a 40-acre piece of land in what was commonly called "alkali flat." No one else wanted this land, for it was a dense entanglement of mesquite, quail brush, and tules. The water table on most of the land was right at the surface. The land was his to do what he could to make it produce.

Money was almost nonexistent with Yamashita, so a hand-grubbing operation was started, with all able members of the family helping. The first year, about 5 acres near Muddy River channel was grubbed and planted to melons. This land was chosen because the water table was lower. Each year a little more land was developed. The Yamashitas worked back up the land from the river, until about 40 acres had been hand grubbed. Meanwhile another 17 acres had been leased.

The Yamashitas signed a cooperative agreement with the Moapa

Note:—The author is soil conservationist, Soil Conservation Service, Reno, Nev.

Soil Conservation District in 1943. A conservation program was worked out, which included: Maintenance of fertility by application of barnyard manure and plowing under green manure crops, application of commercial fertilizers, crop rotations, clearing of additional land, leveling for more efficient use of water and labor, flood-channel realinement, dike construction along the streambanks, waste ditch construction, and drainage and alkali removal.

"We have followed this conservation farm plan to the letter," the Yamashitas pointed out. "The only thing in the plan that we didn't do was to install concrete pipe drains. Instead, we dug open drains. We called upon the Soil Conservation Service for surveys to help us carry out the program, especially in the construction end. The costlier jobs were done with cost sharing from the Agricultural Conservation Program. It is doubtful if we could have done it alone."

The Yamashitas credit the drains, good crop rotations, and leveling as being the key factors in the reclamation of this land so highly saturated with salts and having such a high water table.

The Yamashitas preparing field for fall vegetables. (l. to r.): Kiyoshi, Roy, and T. Yamashita.

Kiyoshi standing in alfalfa field at spot where water table once was so high that horses became hopelessly mired down.

The Yamashita farm now is bordered by two drains the entire length from road to river channel, and the entire farm has been leveled to grade. Not much land in the immediate area is producing such good crops of alfalfa hay and vegetables; and adjacent land without benefit of adequate drains has been abandoned to mesquite and quail brush.

Even with intensive conservation farming, the limited acreage that the Yamashitas had would not support two families and a parent, after expenses. Then the Yamashitas got a chance to lease a neighboring farm. No backbreaking labor was involved here, because the farm was well developed. There was a natural spot for an irrigation reservoir and a layout of fields that lent themselves to good use of waste water.

The Yamashitas leased for 2 years and then, with a loan from the Farmers Home Administration, bought the farm in 1959. Soil Conservation Service technicians found the diversion ditch and reservoir feasible, and they were built in 1959-60. In 1960 Kiyoshi and Roy split their operations, with Kiyoshi taking over the later purchased land and buildings and Roy, the younger brother, remaining on the home place.

Kiyoshi hasn't been so busy working for himself that he has neglected to serve his community or his country. Because of his ability to speak the Japanese language, he served as an interpreter in the Army of Occupation in Japan. He is presently serving on the board of supervisors of the Moapa Soil Conservation District. He and Roy support wholeheartedly other community functions.

Have You Seen? ···

• "Outdoor Recreation in Small Watershed Projects," by SCS, released as USDA's PA-500. As explained in this leaflet, small watershed projects offer an excellent opportunity for the development of water-based recreational facilities, with the additional costs to be shared by sponsoring local governments and the Federal Government, amounting to only a fraction of the total cost of such multiple-purpose projects.

OLD PLANT PLAYS NEW ROLE

By A. D. Williamson and E. R. Simmons

SERICEA lespedeza again has proved its ability to do a tough job—stabilization of floodwater-retarding structures in Virginia.

This is a relatively new problem in stabilization, and imposes rather stern demands on the vegetation used. It requires vegetation that is easily established, quick starting, long lived, and easily and inexpensively maintained. It does not need to be highly palatable forage.

Quick-starting is the only characteristic rated minus for sericea, which has poor seedling vigor; but it has been found in stabilizing structures in the South River subwatershed of the Potomac River that there are ways to overcome the slow start of sericea and thus build considerable permanence into vegetative cover. This is done by use of tall fescue and sericea, either by seeding together or overseeding the fescue with sericea.

The first structure in the Potomac was completed and seeded in the fall of 1954. A total of 55 pounds of tall fescue and 10 pounds of sweetclover to the acre was seeded. Two tons of lime and 1,000 pounds of 5-10-10 fertilzer an acre were applied before seeding. The same seeding practice was followed on two additional structures in 1956.

Frequent observations revealed that the fescue provided excellent cover for about 2 years. It remained vigorous, even to the point of lodging; but little was seen of the legume. About the third year the fescue began losing vigor and color. The stand began to thin out.

In 1956, the first structure was successfully overseeded with 25 pounds of scarified sericea seed to the acre. The sericea not only germinated and survived in the voids but produced dense stands wherever it had room to grow. On other structures, too, as soon as the fescue began to lose vigor, the sericea began to fill in and take over. Even though the original seeding of sericea produced only a limited stand, the few vigorous, mature plants produced an abundance of seed, which in turn seeded voids as they developed.

Sericea lespedeza 3 years after overseeding in Ky. 31 tall fescue.

Tall fescue still is depended upon to give quick cover in the original seeding. Since 1957, sericea with the fescue has been incorporated as standard seeding practice. Today, 9 of the 11 floodwater-retarding structures in the Potomac subwatershed have good stands of sericea lespedeza obtained by overseeding it in established stands of fescue. The other two are maintained in grass cover.

With little or no maintenance treatment, it provides satisfactory vegetative cover for floodwater-retarding structures and other critical areas. Once established, this combination can be managed in two ways: (1) By not mowing or fertilizing, the sericea will tend to dominate the site; and the fescue will tend to be suppressed. (2) Mowing at least once a year, preferably in July, and fertilizing with a complete fertilizer high in nitrogen, give the fescue a better chance,

Sericia lespedeza (dark plants) in time will take over the tall fescue grass on this watershed dam.

Note:—The authors are, respectively, State soil conservationist, Richmond, Va., and soil conservationist, Staunton, Va., both of the Soil Conservation Service.

and the mixutre tends to be balanced with fescue and sericea.

Although other vegetative combinations are possible, it is believed that the fescue-and-sericea combination provides the longest lasting and lowest cost vegetative cover for floodwater structures and other critical areas.

Family and Neighbors

Enjoy Farm Pond

By Waldo H. Rodene

ORVILLE NOBBE near Allen in northeastern Nebraska decided to develop a wooded spring area for protection and winter feeding of his livestock.

When he was through, he had not only the feeding and protection area, but a farm pond, picnic and family and neighborhood recreation site, and a wildlife area thrown into the bargain.

"I had in mind a dam in this area in connection with wildlife and stock protection since the day I put in my first terraces," Nobbe recalls. "I needed a stable water supply and protection from erosion. I hated to see that good spring water going to waste."

He went to see the Soil Conservation Service men assigned to the Dixon County Soil Conservation District. That's when the fish and wildlife developments and the area for picnics for the family and neighbors were added to the project.

Nobbe family enjoying a picnic at their pond.

Livestock watering tank outside fenced pond.

Note:—The author is work unit conservationist, Soil Conservation Service, Auburn, Nebr.

Nobbe sprigging in Reeds canarygrass to control shoreline erosion.

The watershed contributing to the pond is primarily of wooded pasture, with a small cultivated area under complete conservation treatment. Because the wooded pasture provided little grazing, SCS technicians recommended that it be protected from livestock and used for wildlife. Nobbe fenced the pond and picnic area to protect it from livestock, which get water below the dam from a trough supplied by a syphon tube.

In building the pond, the contractors cut a steep slope along the shoreline to discourage water weeds. Nobbe next fenced a shallow area to provide swimming for his children. The dam, emergency spillway, and waterline are seeded to brome and Reed canarygrass. To speed up establishment of Reed canarygrass around the shoreline, Nobbe sprigged freshly cut grass.

The pond is stocked with bass and bluegills, through cooperation of the Nebraska Game Forestation and Parks Commission and the Bureau of Sports Fisheries and Wildlife.

The Nobbe family, including four daughters, has had immense enjoyment out of the new area, along with neighbors and friends, and is looking forward to many more years of fun ahead from this practical water facility designed primarily to meet livestock needs.

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When President Lincoln by a stroke of his pen signed the act, May 15, 1862, creating the Department of Agriculture, 1 American farmworker was producing enough food and fiber for 5 people. But when President Kennedy proclaimed the Centennial Year of USDA 1 farmer was growing enough food and fiber for 26 people.

Ezra Briggs—

Gophers Started Him Out

WHEN a Civilian Conservation Corps camp was set up near Sebastopol back in 1935 California Rancher Ezra Briggs was more interested in getting rid of gophers than in erosion control. The rodents had riddled his land with burrows.

One morning, after a night of heavy rain, he found that two streams, fed by gopher runways, came together and gouged out a gully 10 feet deep and 100 feet long in his corral. He appealed to the Soil Conservation Service, which had the CCC boys construct a concrete-lined channel for permanent protection, while Briggs got after the gophers. The lined ditch is still functioning, and there has been no further erosion.

This personal experience directed his attention to the need for erosion control and conservation land management in the community. In order to cooperate with the CCC project more effectively, the farmers organized a Soil Erosion Association, which guided their conservation work much as soil conservation district boards do today. Ezra Briggs, having a strong "help-your-neighbor" philosophy, was made president.

When the CCC camp closed in 1941, the Association leaders organized the Gold Ridge Soil Conservation District with Briggs as its president. He is still president after 21 years, during which time the district has grown from 99,000 acres to 134,000 acres, with more than 1,200 farmers out of its approximately 2,000 operating units having basic conservation farm plans.

In addition to carrying on an active program of getting conservation on the land, Briggs and his fellow directors have been education-conscious. Through the influence of the district, essay contests and field tours are held annually. Classroom lectures on resource conservation are mandatory for biology students in the local Union High School.

Ezra Briggs is a quiet, unassuming man, but he is both patient and persistent in his efforts to spread the gospel and the practice of soil conservation. His effectiveness is evidenced by his various activities.

He is chairman of the resolutions committee and a past area director of the California Association of Conservation Districts; chairman of the Santa Rosa Milk Producers Association; a director and executive committee member of the County Farm Bureau; board chairman of the Sebastopol Cooperative Apple Cannery; and a director of the Sonoma-Marin Dairymen's Association and of the American Dairy Association.

He also is active in 4-H Club and FFA group work. He is a member of the Rotary Club, and the Grange.

But with all these activities, Briggs' primary interest is natural resource conservation. He is manager of a 252-acre ranch, which is a combination of apple orchards and permanent pasture.

Last year, his fellow conservation district board members presented him with a plaque in appreciation of his long service to the community. It was estimated he had given more than a full year of working man-hours to the organization. In acknowledging the honor, it was typical of him to ignore his own contributions and to comment: "Farmers don't want to see their soil washed away, and we are going to continue to help them." Helping people is second nature with Ezra Briggs.

—FRED W. HERBERT

Vice-president W. K. Heathorne presents President Briggs with gift marking 20 years' work with Gold Ridge SCD as Mrs. Briggs looks on.

KNEE-DEEP IN TREES

By Howard M. Hughes

MEMBERS of the Future Farmers of America chapter in the Trego Community High School at Wakeeney, Kans., are knee-deep in trees.

The chapter buys bare-rooted cedars and pines each spring, pots them, cares for them, and sells them the following spring to conservation farmers and ranchers. And a thousand seedling conifers make a sizable knee-high "forest."

The project adds up to a needed service for cooperators with the Trego County Soil Conservation District. Income from the project finances assorted chapter activities.

After a year in pots, the tiny trees have a stronger root system. When they are planted in windbreaks or shelterbelts called for in farmers' soil conservation plans, more of them live and grow. There is not so much replacement, which is both expensive and time-consuming.

Loren Detwiler, vocational agriculture instructor, points out that the project has been going on since 1957. It began when William Crawford, Soil Conservation Service work unit conservationist, suggested it would be a help to the district program if the seedlings for windbreaks could grow for a year in pots. In that 21-inch average rainfall area, starting young trees is never a sure thing. The FAA members started with 250 trees that first year. This last spring they potted 1,000.

The trees are only 9 to 12 inches high when the chapter buys them through the State Extension Forester at Kansas State University. The seedings go into tar paper pots filled with good soil. The trees grow only about 4 inches in a year, but Crawford and Detwiler point out the advantage is in giving the root system of a young tree time to develop. This is a key to successful survival. They report that potted stock has 90 percent survival even in the driest years, as compared to only about 50 percent survival for bare-rooted stock.

Note:—The author is area conservationist, Soil Conservation Service, Hays, Kans.

Lawrence Waldschmidt of Trego County SCD and daughter in new windbreak planting on 1,200-acre ranch.

Vo-Ag boys planting seedlings.

Social Note

It probably will be quite a while before another Western Snow Conference ends on a nuptial note as the one did in Wyoming in 1962.

The groom was Author John E. Priest of "Snow Surveys in West Pakistan" in the August issue of SOIL CONSERVATION. The bride was Pamela Barnett of Pakistan, whom Priest met in London, where she was a secretary.

The "conservation wedding" came about because Priest, representative of a Chicago engineering firm assigned to Lahore, West Pakistan, and Miss Barnett could not delay in London for the required marriage license waiting period. The 3-day snow conference at Cheyenne, which he was planning to attend before returning to Lahore, provided the first opportunity to obtain a license; so they flew to the United States, proceeded to Cheyenne, attended the conference, and, with snow surveyors and other well-wishers in attendance, were married at the First Baptist Church immediately after adjournment of the meeting.

R. A. Work, head of the Soil Conservation Service's water supply forecast unit at Portland, Oreg., was best man; Homer J. Stockwell of the same office gave the bride away; and Mrs. George W. Peak, wife of the SCS snow survey supervisor for Wyoming, was matron of honor.

The newlyweds now are safely back in Pakistan!

Ohio Eagle Scout Wins High Conservation Award

By Robert Mills

YEOMAN'S service in behalf of the conservation of soil and water and related resources has added the Boy Scouts of America's coveted Hornaday Award to the honors earned by recently graduated Michael L. Wilson of the Bucyrus (Ohio) High School.

The award, the highest Scouting recognition in conservation, was conferred upon Eagle Scout Wilson of Troop 41 at a recent Court of Honor in Bucyrus.

The award program was instituted in 1920 in honor of the late William T. Hornaday, a pioneer in inspiring public recognition of the importance of conservation. The award is made by the National Council of the Boy Scouts of America, in cooperation with the New York Zoological Society. It is given for distinguished service in conservation, and consists of an engraved medal and attaching ribbon. Only about 12 Scouts each year meet the high standard of accomplishment.

Mike, son of Glenn and Mrs. Wilson of Bucyrus, started out 9 years ago as a Cub Scout. In his advance through the ranks to Eagle Scout, he became a brotherhood member, scouting Order of the Arrow, and earned the God and Country award.

Mike credits veteran Scoutmaster Joe Cotner, who formerly served Troop 41, with helping to inspire his interest in conservation. He took part with his troop in several "Boy Scout Forestry Days" which Cotner arranged at the County Home Farm in 1956 and at the LaVern Eichhorn farm in 1957, before he formally entered the

Mike Wilson.

Hornaday program that year. Albert Mascari, former district Scout executive, gave Mike guidance and arranged for a Soil Conservation Service technician to serve as his counselor.

In 1958, Mike participated with his troop and members of Troop 63 of Chatfield in a wildlife management field day at the Orville Schwemley farm, in which 1,500 wildlife trees and shrubs were planted around a newly built conservation farm pond. Later that year, Mike was active in a troop pond-mulching project and wildlife tour. By his regular participation, and by the instruction he gave to the younger Scouts, Mike helped Cotner make the field days a success.

In the Hornaday program Mike has given numerous illustrated talks to school, scouting, and soil conservation district groups. He prepared or helped build numerous exhibits for display in business windows and at the county fair, including a conservation entry in the school science fair that was rated superior.

In 1960, Mike was presented a plaque "For Outstanding Service in Conservation" by the board of supervisors of The Divide Soil Conservation District. His parents became cooperators with the district, and have installed a complete conservation plan on their specialized truck farm.

The young Hornaday Award winner also has taken part in radio broadcasts and written an article on Scout conservation activities for the Ohio Conservation Bulletin. As high school senior, he also found time to serve as editor-in-chief and vice-president of the School's Annual.

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Dr. Reuben G. Gustavson of the University of Arizona in delivering the Colorado State University commencement address in June said: "To deny a person the opportunity to develop his mind to the maximum is the greatest tyranny which man has ever imposed upon his fellow man." He emphasized the vital need for education in today's fast-paced world and praised the 100-year old Land-Grant College system.

Note:—The author is work unit conservationist, Soil Conservation Service, Bucyrus, Ohio.

AFTER A HUNDRED YEARS: The Yearbook of Agriculture. 704 pp. Illus. 1962. Washington, D. C.: U. S. Government Printing Office. $3.

For the person who wants to reflect on the history of agriculture in this country, the 1962 Yearbook of the U. S. Department of Agriculture is a "must". The story of American agriculture is indeed a story of America, and this 63d book to be printed since these annual publications were first called "yearbooks" in 1894 lays it out simply but dramatically.

There can be no doubt that agriculture laid the foundation on which this country was built—the foundation from which industry rose to become a world leader. This book, in 704 pages with 706 outstanding photographs, unfolds the story of the early struggles of the pioneer farmer who looked out on half a continent opened up by the Homestead Act of 1862. It sheds light on the revolution that took place between the hardships and privations of these pioneer farmers and the young farmer of today with the wealth of advantages enjoyed by no other people.

It relates how the breeding of plants and animals, control of insects and diseases, conservation of soil, water, and forests, improving of markets, domestic and foreign, and development of agricultural technology in general were accomplished through the growth of the Land-Grant Colleges and the Department of Agriculture, combined with a farm population ever alert to new ways to do its job.

There's a glimpse of the heartbreak of the '30s and the technical revolution that followed to make the American man of the soil the most efficient farmer on earth. And the reader of this book sees how the farmer and the city man have been drawn closer together.

Of special interest to conservationists is the story of the menace of erosion; how the Nation's farmers organized to fight soil and water loss through a new local organization called the soil conservation district; the development of the small watershed program; and the soil survey that started in 1899.

One thing is certain—productive soil will remain the basis of an efficient agriculture and a prosperous economy. A look toward the future indicates that the care of our soil and water will be as important tomorrow as it is today. While an organized approach to soil conservation started late in the last hundred years, conservation is an important part of the revolution in agriculture.

This Yearbook certainly will take its place alongside the others in this series as an autstanding contribution to American agricultural history.

—ALBERT B. FOSTER

COMPARISONS IN RESOURCE MANAGEMENT AND THEIR POSSIBLE U. S. APPLICATION. Edited by Henry Jarrett. 271 pp. 1961. Johns Hopkins Press, Baltimore, for Resources for the Future, Inc. $4.50.

The 18 essays in this book were presented originally as public lectures in the Forum on Comparative Resources Policy and Administration, held during the spring of 1961 by Resources for the Future, Inc. For each subject, one essay explains the nature of the problem in the United States; the second explains what another country is doing about it; the third considers what the United States can learn from the experience of the foreign country. The subjects, and the foreign countries offering experience, are:

National parks administration: England and Wales—Small Forest holdings: Sweden — Preservation of natural areas: Great Britain—Water pollution abatement: West Germany — Local integration of programs: Ontario, Canada—Development of a region: France.

The essayists (lecturers) are all men of well-known reputation. The lengthy list includes such authorities as Conrad Wirth, Richard McArdle, Donald A. Williams, E. M. Nicholson, Stanley Cain, Edward H. Graham, Ayers Brinser, and John Nixon.

Material offered in the essays is rich, and will well repay reading by any professional man in the natural resources field. Very little is said about either scientific or technological methods, or about techniques of administration, as the editor notes. As he also says, "The resources problems that cause the most trouble almost always have strong social and institutional elements requiring public agreement on goals and public choices among alternative lines of action." Hence, in these essays, the reader will find greatest emphasis "on the social values involved in defining resource problems, establishing general objectives, and organizing programs to attain them."

This is well done work worth thoughtful consideration by all conservationists hopeful of improvement in the present programs of the United States.

—WILLIAM R. VAN DERSAL

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The Rutgers University soils department found dairy pasture and hayfields that could take almost 5 inches of rain an hour, compared to the slowest intake of 0.3 inch an hour on a potato farm, and 0.5 inch on a vegetable farm. Most irrigation equipment is designed to deliver 1 inch of water an hour, but the Rutgers test showed that only one-third of the farms visited were capable of using that amount.

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"We can balance the productivity of our farmland with the ability of this Nation to use food and fiber effectively and efficiently by applying more fully our land and water resources in sound conservation programs to meet the growing nonfarm demands on land and water made by an increasingly urban and metropolitan nation.

"Much attention has been devoted in recent years to the multiple use concept on public lands. The Department, for example, has long managed the National Forests not only for timber, but also for recreation, wildlife, forage, and water.

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"The goals are as important as food, raiment, shelter, pure water, fresh air, green spaces, and the eternal eloquence of Nature and her wild creatures.

"We are fortunate to have the resources, the technology, the experience, the foresight, and the will to achieve these goals."

(Excerpts from address by Secretary of Agriculture Orville L. Freeman at White House Conference on Conservation at Washington, D. C., May 24, 1962.)

Have You Seen?---

● "Stabilizing Sand Dunes on the Pacific Coast, With Woody Plants," by Robert L. Brown and A. L. Hafenrichter of the Soil Conservation Service, released by the U. S. Department of Agriculture as Miscellaneous Publication 892. Major uses of woody plants in dune stabilization are given in this bulletin. In planning for the use of woody plants, shrubs for intermediate and auxilliary stabilization and trees for semipermanent and permanent stabilization are discussed, as well as the culture and management of woody plantings.